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CONNECTICUT DEPARTMENT OF  
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Commissioner J. Robert Galvin, M.D., M.P.H.

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Oral Health Unit  
410 Capitol Avenue  
Hartford, CT 06134



# Facts About the Relationship between Medical and Oral Disease.

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## INTRODUCTION

Current research has substantially contributed to a heightened awareness and understanding of the relationship between oral health and overall health. Physicians should include an oral health history and examination in their medical practices to help diagnose, manage, and contain numerous serious systemic diseases. The following highlights the most current science, focuses on the key points, answers some frequently asked questions, and provides the medical professional several helpful resources.

***Oral diseases can seriously impact medical diseases and conditions, including:***

- Cardiovascular disease
- Diabetes
- Preterm low birth weight
- Cancer
- HIV/AIDS
- Smallpox

Oral diseases can seriously impact behavioral, developmental, psychological and social outcomes that affect general health and well-being, including:

- Poor nutrition
- Speech impairment
- Poor self-esteem and other psychosocial problems

## SYSTEMIC AND ORAL DISEASES

### ***Cardiovascular Disease and Oral Diseases***

- A strong association has been reported between dental plaque, periodontal inflammation and subacute bacterial endocarditis (SBE). The streptococci present in large numbers in dental plaque are commonly found in the blood of patients suffering from SBE.<sup>1,2</sup>
- Known risk factors for cardiovascular disease (CVD) can only account for about two-thirds of the incidence of CVD cases. There is mounting evidence that there may be an

- Periodontitis is a transmittable infectious disease. With progressive destruction of the periodontal (around the tooth) tissues, the infection can spread via the alveolar bone vasculature throughout the face and body.

## FOR FURTHER INFORMATION AND RESOURCES, CONTACT:

### State of Connecticut Department of Public Health

Bureau of Community Health, Family Health Division

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410 Capitol Avenue, P.O. Box 340308

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Phone: (860) 509-8066, Fax: (860) 509-7720

Website: <http://www.dph.state.ct.us/> and visit the 'Oral Health Matters' WebPages.

### University of Connecticut School of Dental Medicine

Department of Oral Diagnosis

Phone: (860) 679-2952

Website: <http://sdm.uchc.edu/departments/oraldiagnosis/>

### American Academy of Pediatric Dentistry

Phone: (312) 337-2169

Website: <http://www.aapd.org/>

### National Maternal and Child Oral Health Resource Center

Phone: (202) 784-9771

Website: <http://www.mchoralhealth.org/>

### NIH / National Institutes for Dental and Craniofacial Research/

Centers for Disease Control and Prevention Dental, Oral and Craniofacial Data Resource Center

Phone: (301) 294-5634

Website: <http://drc.nidcr.nih.gov/>

### NIH / NIDCR / CDC Oral Health Resource Center

Phone: (770) 488-6054

Website: <http://www.cdc.gov/OralHealth/>

prostaglandin E2 and TNF- $\alpha$ , possibly contributing to premature labor and PLBW.<sup>16-18</sup>

- A linear causal relationship between periodontitis and PLBW has not yet been established. Increased risk for developing both periodontitis and PLBW may be genetically determined.

### *Osteoporosis and Oral Disease*

- An association has been suggested between systemic osteoporosis of the spine and hip, and periodontal bone and ligament attachment loss. Current studies are looking at whether or not hormone replacement therapy may offer some protection of bone density, not only the spine and hipbone, but of the maxilla and mandible, as well.<sup>19</sup>

### *Life-Threatening Infectious Diseases and Oral Disease*

- **HIV/AIDS.** More than 90 percent of HIV-infected adults and children will have at least one oral manifestation during the course of the disease. At least 40 oral and peroral lesions have been associated with HIV/AIDS. Oral lesions may be the first sign of and pathognomonic for HIV. Early oral manifestations may include: atypical gingivitis, periodontitis, and dental decay; diffuse fungal infection of the tongue and buccal (cheek) mucosa; herpes stomatitis; recurrent and persistent aphthous stomatitis; hairy leukoplakia of the lateral borders of the tongue; and HIV salivary gland disease, such as xerostomia (dry mouth) and parotid swelling. The oral manifestations of late-stage HIV/AIDS include swelling and pigmentation of the tongue and roof of the mouth associated with Kaposi's sarcoma and lymphoma. At any stage in the disease, the occurrence of oral signs and symptoms may be a useful clinical marker for the progression of the HIV/AIDS.<sup>20</sup>



*Hairy Leukoplakia in patient with HIV/AIDS*



- **Smallpox.** The oral and peroral maculopapular rash of viral infections—including measles (rubeola), chickenpox (varicella), and smallpox (variola)—typically appear 48 to 72 hours after the prodromal febrile stage. The *first* rash to appear often involves the oral mucosal and peroral tissues; followed by progressive spread to the face, arms, trunk and legs. The patient is most



Oral-facial rash of Smallpox

infectious during the first week of the appearance of the oral lesions when the vesicles ulcerate and release substantial amounts of virus into the saliva. Early detection of potentially life-threatening infectious disease, such as smallpox, is of critical importance, particularly faced with the current heightened threat of worldwide bioterrorism. Chickenpox and smallpox may be difficult to clinically differentiate, making it all the more important to carefully examine the mouth and peroral tissues to reach the earliest possible definitive diagnosis, treatment and disease containment.<sup>21</sup>

### Other Medical Conditions and their Relationships to Oral Disease

Recent reports in medical and dental journals suggest that oral disease may be a risk factor for several other systemic diseases and conditions. These include a possible link between periodontal infection and respiratory tract infections, obesity, malignant neoplasms of the lung, and stress.<sup>22</sup>



Facial (Dental) Abscess

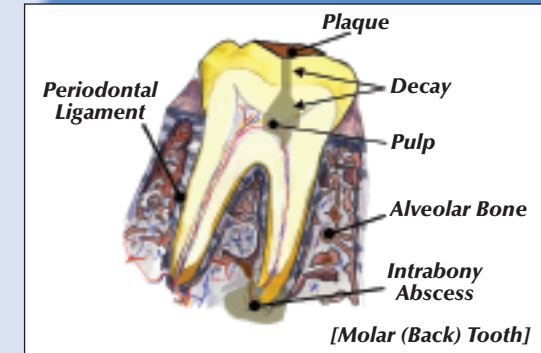
## ORAL DISEASES: DENTAL DECAY AND PERIODONTITIS

### Dental decay

- Oral disease, in the form of dental decay, is the most common chronic disease of childhood—five times more prevalent than asthma.

- Dental decay is a painful transmittable infectious disease
- Dental decay is an active process of progressive tooth destruction by bacterial acids, byproducts of the bacterial metabolism of carbo-hydrates in foods

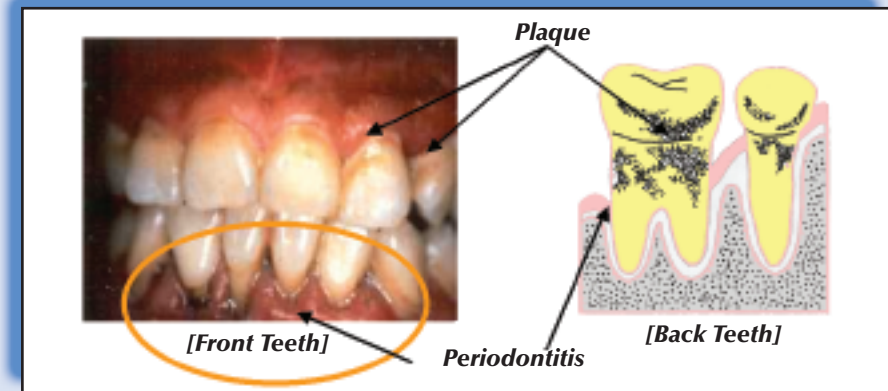
- “Plaque” is a sticky collection of bacteria and food substances, high in sugars and other carbohydrates, adhering to the teeth
- The bacterium found in plaque and most commonly associated with dental decay is *Streptococcus mutans*



- The pulp is made up of blood vessels, nerves, and connective tissues contained within the central chamber and roots of the tooth. Infection can spread via the pulp to the alveolar bone vasculature and then throughout the face and body.

### Periodontitis

- “Periodontitis” (periodontal disease) is the inflammation, infection and related destruction of the tissues around the teeth: the gingiva (gums), alveolar bone, and ligaments that anchor the tooth to the alveolar bone.
- The microorganisms commonly associated with advanced periodontitis are non-saccharolytic anaerobic gram-positive rods: *Porhyromonas gingivalis*, *Bacteroides forsythus*, *Treponema denticola*, and *Actinobacillus actinomycetemcomitans*.



association between periodontal disease and heart disease.<sup>3</sup> Elevated C-reactive protein (CRP) levels increase the risk for cardiovascular disease; the cause of the elevated levels remains unclear. Periodontitis has been implicated. The inflammation of periodontium causes bacterial byproducts to enter the bloodstream, which, in turn, trigger the liver to make proteins, including CRP, that inflame arteries and promote blood clot formation.<sup>4</sup>

### Diabetes Mellitus and Oral Disease

- Uncontrolled diabetics frequently develop generalized gingival swelling, periodontal bleeding, advanced bone loss, and abscesses.<sup>5-8</sup> This may be due to compromised peripheral vasculature of the diabetic's periodontal tissues which reduces the flow of nutrients and cellular wastes, making the patient more susceptible to bacterial infections such as periodontitis.<sup>11-13</sup>

#### Severe periodontitis in diabetic patient



Pyogenic granuloma

- Conversely, it is also important to control periodontitis in the management of diabetes. Periodontal disease can incite a bacteremia and increase blood sugar, making diabetes more difficult to control, and placing the patient at increased risk for diabetic

complications.<sup>9,10</sup> The diabetic patient should be well informed about the importance of oral health in the management of their diabetes.

### Preterm Low birth weight and Oral Disease

- The incidence of low birth weight (<2500g) in preterm infants (PLBW), a significant cause of perinatal morbidity and mortality, remains at disturbingly high levels.<sup>14,15</sup> Chronic infection, such as periodontitis, has been implicated as a possible contributing factor to PLBW. The level of circulating biologically active molecules, such as prostaglandin E2 and TNF- $\alpha$ , are normally raised prior to labor and delivery. They are also raised to artificially high levels by infection. Periodontal infection causes cell destruction and the resultant release of lipopolysaccharides (LPS) into the bloodstream. LPS triggers the release of immune modulators, including

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